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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/600,206	11/13/2000	Graham O'Neill	22749/04002	7913

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EXAMINER	
MICHALSKI, JUSTIN I	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/600,206	O'NEILL ET AL.	
	Examiner	Art Unit	
	Justin Michalski	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32 and 34-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *30-32 and 34-40* is/are allowed.

6)☒ Claim(s) *1-9 and 13-29* is/are rejected.

7)☒ Claim(s) *10-12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-7, 13, 26, 27, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orban (US Patent 4,525,857) in view of Ngarmnil et al. ("Ngarmnil") (Ngarmnil, J. et al., "A fully tuneable micropower log-domain filter", IEE Colloquium on Low Power Analogue and Digital VLSI: ASICS, Techniques and Applications, London, 2 Jun 1995 Page(s) 9/1 - 9/4).

Regarding Claim 1, Orban discloses an analogue signal processor (Fig. 2), comprising an audio signal input (40), an output (46) for providing a processed audio output signal, and a tone control circuit coupling the input and the output and comprising first (60) and second (62) filters having different low-pass bands and a subtractor (76) for subtracting the output currents of the filters to produce a filtered signal (46). Orban does not disclose the filters being log-domain MOS transistors operating in week inversion and being tuneable in the audio frequency range to adjust the low-pass cur-off frequency. Ngarmnil discloses a log domain MOS transistor filter operating in weak inversion and the cut-off frequency of the filter can be tuned via a current source (Page 9/1, I and II). Ngarmnil further discloses that the log-domain filter is very attractive to low power filters. Therefore, it would have been obvious to one of ordinary skill in the

art at the time the invention was made to modify Orban with the low-pass filter as discloses by Ngarmnil in order to produce a circuit requiring less power consumption.

Regarding Claim 2, Ngarmnil further discloses a log converter (i.e. compressor) (Figure 1) coupling the input of a tone control circuit for compressing the dynamic range of the input signal.

Regarding Claim 3, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a voltage-to-current converter would be a possible mode of implementation for the compressor as illustrated by Waldhauer (US Patent 4,882,761) (Column 2, lines 51-56).

Regarding Claim 4, Ngarmnil further discloses the MOS transistors operating in weak inversion (Page 9/1, II).

Regarding Claim 5, Ngarmnil further discloses that compressor (Fig. 1) provides control of sensitivity (Page 9/1, I).

Regarding Claim 6, it would have been obvious to one of ordinary skill in the art at the time the invention was made that an amplifier could be placed after the tone control circuit for increasing the output to a desired level.

Regarding Claim 7, Ngarmnil further discloses the input of Figures 1 and 2 being a current source (i.e. current signal).

Regarding Claim 13, Ngarmnil further discloses Figure 1 only having one output (I_{out}).

Regarding Claim 26, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the device could be implemented on a single chip using integrated circuit technology.

Regarding Claim 27, Ngarmnil further discloses the log-domain filter for use in an electronic cochlea (i.e. aural prosthetic) (Page 9/3, VI).

Regarding Claim 28, Ngarmnil further discloses the log-domain filter for use in an electronic cochlea (i.e. hearing aid) (Page 9/3, VI).

Regarding Claim 29, Ngarmnil further discloses the log-domain filter for use in an electronic cochlea (i.e. cochlear implant) (Page 9/3, VI).

3. Claim 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orban as modified as applied to claim 1 above, and further in view of Shannon et al. (US Patent 5,549,658).

Regarding Claim 8, as stated above apropos of claim 1, Orban as modified makes obvious all elements of that claim but does not disclose a biphase signal generator for supplying a biphase signal. Shannon et al. discloses a biphase signal generator (Figure 5, generator 72) for supplying to the output a biphase signal modulated by the processed audio output signal. Shannon et al. teaches biphasic signals permit signals to be inductively coupled through the skin with reasonable efficiency (Column 15, lines 27-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a biphasic signal to efficiently couple an electric signal through the skin.

Regarding Claim 9, Orban discloses a processor as stated in claim 1 but does not disclose full-wave rectification. Shannon discloses the use of full-wave rectifier circuits RECT1-4 and effectively derives the instantaneous envelope of the audio signals in the band. (Column 12, line 65 through Column 13, line 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include full-wave rectifiers to effectively derive the instantaneous envelope of the audio signal as taught by Shannon.

4. Claims 14-17 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orban as modified as applied to claim 1 above, and further in view of Michelson (US Patent 4,400,590).

Regarding Claim 14, as stated above apropos of claim 1, Orban as modified makes obvious all elements of that claim and discloses a tone control (frequency selective ability (i.e. tone control) of a set of filters) (Introduction, lines 1-3) for adjusting the intensity/frequency of the processed audio signal. Orban does not disclose a plurality of outputs. Michelson discloses an audio signal processing circuit (Figure 1) comprising a plurality of outputs (output of drivers 16) for improvement in speech discrimination over a single output (Column 1, line 64 through Column 2, line 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plurality of signals for producing an array of outputs for enhancing the discrimination of an audio signal.

Regarding Claim 15, Michelson further discloses frequency separation means for separating the intensity/frequency adjusted audio signal into a plurality of frequency-separated signals having different frequency bands (Michelson discloses the filters separate the amplified signals into frequency component bands) (Column 3, lines 22-23).

Regarding Claim 16, Michelson further discloses the filters (14) being bandpass filters (Column 5, lines 3-6).

Regarding Claim 17, Ngarmnil further discloses the use of log-domain filters comprising of MOS transistors (Page 9/1, Introduction).

Regarding Claim 21, as stated above apropos of claim 1 Orban as modified makes obvious all elements of that claim. Orban does not disclose the intensity/frequency response of the tone control unit is controllable by a user. Michelson discloses the frequency components (i.e. frequency/intensity response of the tone control circuit) can be shaped to the requirements of the individual user (Column 2, lines 40-43). Therefore, it would have been obvious to one or ordinary skill at the time the invention was made to allow the components to be adjustable in order to customize the output to the individual user.

Regarding Claim 22, Michelson further discloses means for adjusting the treble response and bass response of the electrical signal (Column 6, lines 15-20)

Regarding Claim 23, Michelson further discloses means for adjusting the treble boost and bass boost of the signal (Column 6, lines 15-20).

Regarding Claim 24, Michelson further discloses means for adjusting the level of amplification for each frequency component (i.e. signal amplitude) (Column 5, lines 12-16).

Regarding Claim 25, as stated above apropos of claim 1, Orban discloses a subtractor to produce a filtered output. Michelson further discloses filters 14 having an amplifier 12 controlling the input amplitude into the filters.

5. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orban as modified as applied to claim 15 above, and further in view of Shannon et al. (US Patent 5,549,658).

Regarding Claim 18, as stated above apropos of claim 15 Orban as modified makes obvious all elements of that claim. Orban as modified does not disclose biphase signals. Shannon discloses a plurality of biphase signal generators (outputs of 71) for supplying biphase signals modulated by respective ones of the frequency-separated signals (outputs of LM1-4) to respective ones of the outputs. Shannon et al. teaches biphasic signals permit signals to be inductively coupled through the skin with reasonable efficiency (Column 15, lines 27-35). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a biphasic signal to efficiently couple an electric signal through the skin.

Regarding Claim 19, Shannon further discloses sampling means for applying samples of the frequency-separated signals to the respective biphase signal generators (Column 14, lines 7-24).

Regarding Claim 20, Shannon further discloses the sampling means comprises a continuous interleaved sample generator (Column 3, lines 42-46).

Allowable Subject Matter

6. Claims ~~30-40~~ 30-32 and 34-40 are allowed.

7. Claims 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (571)272-7524. The examiner can normally be reached on M-F 7-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JIM

SINH TRAN
SUPERVISORY PATENT EXAMINER